

## REMARKS

Claims 18-20, 23, 24, and 26-37 are pending in the application.

### Claim Rejections under 35 U.S.C. § 103

Claims 18-20, 23-24 and 26-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent Publication No. 2003/0185965A1 to Lin (hereinafter "Lin '965" in view of US Patent Publication No. 2003/0026917A1 (hereinafter "Lin '917") in view of US Patent No. 5,009,966 to Garg.

It should be noted that while independent claim 18 may be regarded as a product-by-process claim - independent claims 20, 24, 35 and 37 are clearly product claims and not product-by-process claims. The Examiner rejects the claims while stating that the claims being examined are product-by-process claims:

It is noted that the claims examined are product by process claims where the examiner has interpreted the claims as pertaining to the article that is the final product of the process. The intermetallic compound is removed during applicants claimed product or process and is therefore not present in the final product (see applicants claim 18 (ii).)

Applicant agrees that independent claim 18 may be regarded as a product-by-process claim, since it refers to a component generated by a refurbishment process. However, independent claims 20, 24, 35 and 37 are product claims and not product-by-process claims. These claims contain no process limitation and consequently, are not product-by-process claims. If the Examiner disagrees with this conclusion, applicant respectfully requests Examiner to explain why he would consider these claims to be product-by-process claims and the relevant legal standards.

For example, claim 20 is to a substrate processing chamber component comprising a titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and titanium metal coating on the

structure, the titanium metal coating having a textured surface. It has no process limitations.

Further, claim 24 is to a substrate processing chamber component comprising a structure made from titanium, the titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and a titanium metal coating on the titanium structure, the titanium coating having a textured surface. It also has no process limitations.

Note also claim 35 which is to a product for a substrate processing chamber component comprising a structure made from titanium, the titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and a titanium metal coating on the titanium structure, the titanium metal coating comprising a twin-wire arc sprayed titanium metal coating having a textured surface. This claim also has no process limitations.

Note further claim 37 to a substrate processing chamber component comprising a titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and a titanium metal coating on the structure, the titanium metal coating having a textured surface. Again, there are no process limitations.

For this reason, applicant respectfully requests Examiner to provide separate rejections to the product claims as listed above, which identifies legal reasoning that is not based on, and is different from, the legal reasoning and rejection of a product-by-process claim. The courts have consistently ruled that in order for a prima facie case to be established, "the analysis supporting a rejection ... should be made explicit," KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1396 (2007) and "rejections on obviousness cannot be sustained with mere conclusory statements" In re Khan, 441 F.3d 977, 988 (Fed. Cir. 2006). The Examiner has failed to make a prima-facie obviousness rejection of claims 20, 24, 35 and 37, because the prior art references,

either singly or when combined, fail to teach or suggest each and every limitation set forth in claim each of independent claims 20, 24, 35 and 37.

### **Claim 18**

Returning to the Section 103 rejection of the only independent product-by-process claim, namely claim 18, a prima-facie obviousness rejection requires that prior art references, when combined, teach or suggest the invention as a whole. Prior art references that are combined must teach or suggest all the claim limitations. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In making the assessment of differences between the prior art and the claimed subject matter, section 103 specifically requires consideration of the claimed invention "as a whole." Princeton Biochemicals, Inc. v. Beckman Coulter, Inc. (Fed. Cir., No. 04-1493, 6/9/05).

Further, "[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." KSR Int'l Co. v. Teleflex, Inc., 127 S. Ct. at 1741. Instead, in order to determine whether an invention would have been obvious, it is useful to identify some "apparent reason to combine the known elements," either by looking to the teachings of the prior art, the knowledge of one with ordinary skill in the art, or demands present in the marketplace. *Id.* 127 S. Ct. at 1740. "[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id.* at 1741.

Lin '965 in view of Lin '917 and Garg, either singly or when combined, fail to teach or suggest all of the limitations of claim 18, and further, there would not be any apparent reason to one of ordinary skill in the art to combine these references to derive the present claims as suggested by the Examiner

For example, Lin '965 in view of Lin '917 and Garg do not teach " [a] refurbished component for a process chamber, the component comprising a titanium structure having a refurbished textured titanium metal coating ..." as claimed in claim 18.

As acknowledged by the Examiner, Lin '965 does not teach a refurbished process chamber component comprising a titanium structure having a refurbished textured titanium metal coating. Instead, Lin '965 teaches a component comprising a titanium structure, but which does not have a titanium metal coating over the titanium structure.

The Examiner relies on Lin '917 to cure her the deficiencies of Lin '965 on grounds that Lin '917 teaches, in claim 5, that "[t]he underlying structure can be aluminum and the coating can comprise titanium (claim 5 reference Lin '917.)"

However, the Examiner misinterprets the teachings of claim 5. In fact, Lin '917 does not teach a titanium metal coating as claimed in claim 18. Instead, Lin '917 teaches a plasma processing chamber having a coating comprising titanium oxide. For example, Lin '917 teaches:

[0036] The component 410 is surface roughened to particular levels that provide at least some of the final texture of the exposed surface 422. The roughened surface 436 is coated with a plasma sprayed coating 420 that at least partially conforms to the surface 436 while also imparting additional texture characteristics, to provide a textured exposed surface 422 that significantly improves the adhesion of the sputter etched material onto the component 410. The coating 420 may be made of a material 425, such as a ceramic material, such as, for example,  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2$ , or mixtures thereof.

[Lin '917, page 4, paragraph 36] Thus, in one version, the coating of Lin '917 can comprise titanium oxide. The language of claim 5 of Lin '917 as cited by the Examiner does not teach a coating of titanium metal, but instead was simply written broadly to cover coatings "comprising titanium" when the disclosure teaches titanium oxide. The language of claim 5 is not a teaching to a titanium metal coating as claimed, but instead

a titanium oxide coating. Thus Lin '917 does not teach or suggest a process chamber component having a "titanium metal coating" as recited in claim 18.

Lin '917 also does not teach a component having an underlying structure comprising titanium, also as recited in claim 18. Instead, Lin '917 teaches a component structure made from aluminum or various alloys comprising aluminum or stainless steel, or even Inconel, as follows:

A portion or all of the process chamber 100 may be fabricated from metal or ceramic materials. Metals that may be used to fabricate the process chamber 100 include aluminum, anodized aluminum, "HAYNES 242," "Al-6061," "SS 304," "SS316," and INCONEL, of which anodized aluminum is sometimes preferred.

For example, in one version, the process chamber 100 comprises an enclosure wall 120 that is fabricated from a ceramic material that is substantially permeable to RF wavelengths, such as quartz.

[Lin '917, page 2, paragraph 20.] "Al-6061" is an aluminum alloy, and the material "INCONEL" is a nickel and chromium alloy. Al-6061 and INCONEL alloys can include trace amounts of titanium. However, the titanium concentration in Al-6061 is about 0.15% by mass, and in INCONEL, titanium is included in a concentration of 0.4% by mass, or less. The teachings to Al-6061 and INCONEL are not teachings to a process chamber component "...comprising a titanium structure..." as recited in claim 18.

Further and as explained above, and as acknowledged by the Examiner, Lin '965 also does not teach a refurbished process chamber component comprising titanium metal coating over the titanium structure. Thus the combination of Lin '965 and Lin '917 do not teach or suggest the product limitations of "[a] refurbished component for a process chamber, the component comprising a titanium structure having a refurbished textured titanium metal coating ..." as claimed in claim 18.

Furthermore, neither of the two references Lin '965 or Lin '917 provide any apparent reason to derive a structure comprising a refurbished process chamber component having both an underlying titanium structure and a titanium metal coating. Lin '965 teaches a structure, which may be made from a variety of materials in which

titanium is mentioned. However, Lin '965 does not teach a coating comprising a titanium metal on the underlying titanium structure. Nor is it obvious from the teachings of Lin '965, and no apparent reason is provided by these teachings to substitute a titanium metal coating for any of the coatings taught by Lin '965.

Lin '917 teaches a component comprising a titanium oxide coating and not a titanium metal coating as claimed in claim 18. Further, the component of Lin '917 does not have an underlying titanium structure. Instead, Lin teaches a component structure of aluminum, anodized aluminum, "HAYNES 242," "Al-6061," "SS 304," "SS316," and INCONEL or even quartz. None of these teachings are to a process chamber component comprising a titanium structure as recited in claim 18. Further, one of ordinary skill in the art would have no apparent reason to provide a coating of titanium metal on an underlying structure of titanium based on the teachings of Lin '965 or Lin '917. For example, since both materials are the same, it would not be advantageous to undergo a process of coating an underlying structure with the same material as that of the underlying structure itself.

Garg fails to make up for the deficiencies of Lin '965 in view of Lin '917, because Garg also does not teach a process chamber component comprising a titanium metal coating on a titanium structure as claimed in claim 18. A titanium metal coating on a titanium structure is in direct contact with the underlying titanium structure. Instead, Garg et al. teaches coated substrates having an intervening non-reactive noble metal interlayer that lies in-between the underlying structure and the coating. Garg et al. further teaches that a non-reactive noble metal interlayer is necessary when applying coatings to a titanium structure:

"... Because of their reactivity to halogenated reagents, it is difficult to chemically vapor deposit hard protective coatings that strongly adhere to titanium or titanium alloys. This is true because the halogenated reagents and their reaction products in the CVD and CVD-like processes react with the titanium and titanium alloys, causing spalling of the deposited coating. In the case of PVD processes, stresses due to the mismatch of the coefficients of thermal expansion can lead to poor adhesion and spalling."

[Garg et al., Column 1, lines 24-33].

“Therefore, it is desirable to deposit adherent noble material on titanium and titanium alloys prior to coating them with ceramics, hard metal and metal compounds.”

[Garg et al., Column 2, lines 15-18]. Thus, one of ordinary skill in the art would not combine the titanium coating of Garg with the teachings of Lin '917 or Lin '925 because Lin '917 teaches a titanium oxide coating and not a metal coating. Metal and ceramic have distinct properties and one would not arrive at a metal coating from teachings to a ceramic coating.

Further, there is no reasonable expectation of success with the combination of the coating of Garg with the coating or component of Lin '917 and the component/coating of Lin '965 would result in the claimed invention. Lin '917 teaches neither an underlying titanium structure, nor a coating comprising titanium metal. Lin '965 does not teach a structure comprising a titanium metal coating, nor a structure comprising a titanium metal coating over an underlying structure of titanium, as acknowledged by the Examiner. Garg et al. teaches the desirability of depositing an adherent noble material as an interlayer between a coating and an underlying structure. Garg et al. even suggests that direct coating of titanium metal onto titanium substrates without the noble metal interlayer - causes spalling. Thus even the combination of Garg with Lin '965 or Lin '917 would not result in a titanium metal coating on a titanium structure, as claimed in claim 18.

Further, the combination suggested by the Examiner appears to have been made in hindsight because there is no indication in any of these references that application of a titanium metal coating on the titanium structure is desirable, or that it would provide benefits and advantages as explained in the present application. The combination suggested by the Examiner, accordingly, could only have been made in hindsight and based on Applicants own disclosure. One should not use “...the inventor’s disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.” Iron Grip Barbell Co., 392 F.3d at 1320.

For at least these reasons claim 18, and claims 19 and 27-34 which depend therefrom, are not obvious over Lin '917 in view of Garg.

## **Claim 20**

Lin '965 in view of Lin '917 and Garg, considered singly or when combined, also fail to teach or suggest each and every limitation of claim 20, which is to: a substrate processing chamber component comprising: (a) a titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and (b) a titanium metal coating on the structure, the titanium metal coating having a textured surface.

Lin '965 in view of Lin '917 and Garg do not teach a chamber component comprising a titanium structure having a titanium metal coating as claimed in claim 20. As acknowledged by the Examiner, Lin '965 does not teach a component comprising a titanium structure having a titanium metal coating. Instead, Lin '965 teaches a component comprising a titanium structure, but which does not have a titanium metal coating over the titanium structure. Lin '917 does not teach a substrate processing chamber component comprising "a titanium structure" as claimed in claim 20 and Lin '917 also does not teach a "titanium metal coating" on the titanium structure. Instead, the coating taught by Lin '917 is a titanium oxide coating which is not a titanium metal coating. The underlying structure of Lin '917 is also not a titanium structure. Garg does not make up for the deficiencies of Lin '917 because Garg also does not teach a titanium metal coating on a titanium structure, but instead teaches intervening layers.

Further, one of ordinary skill would have no apparent reason to mix and match the different underlying structures and coatings taught by the cited references to derive Applicant's claims. Lin '965 teaches a component comprising a titanium structure, but does not teach a titanium metal coating. Lin '917 teaches a titanium oxide coating - which is also not a titanium metal coating, and further does not teach a titanium structure. Garg teaches intervening layers and not a titanium metal coating on a



titanium structure. One of ordinary skill would have no apparent reason to remove the intervening noble metal interlayer taught by Garg, and substitute the titanium oxide coating taught by Lin '917, and then take the resultant coating and apply it to the titanium structure taught by Lin '965. Nor would such an extrapolated structure bear a reasonable expectation of success of operability because Garg teaches that the interlayer between the coating and underlying structure is necessary to prevent spalling. Further, in the unlikely event that one of ordinary skill did combine the teachings of Garg with Lin '917, and Lin '925, these teachings still do not teach a titanium metal coating on a titanium structure as claimed in claim 20.

For at least these reasons, Lin '917 and Garg do not render claim 20 unpatentable, nor claim 23 which depends therefrom.

#### **Claim 24**

Lin '965 in view of Lin '917 and Garg, considered singly or when combined, also fail to teach or suggest each and every limitation of claim 24, which is to a substrate processing chamber component comprising: (a) structure made from titanium, the titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and (b) a titanium metal coating on the structure, the titanium metal coating having a textured surface.

As acknowledged by the Examiner, Lin '965 does not teach a component comprising a structure made from titanium. Nor does Lin '965 teach a titanium metal coating on the structure. Instead, Lin '965 teaches a component comprising a titanium structure, but which does not have a titanium metal coating. Lin '917 also does not teach a component comprising "a structure made from titanium" as claimed in claim 24. Lin '917 also does not teach a "metal coating" or a "titanium metal coating" on the component structure. Instead, the coatings of Lin '917 are to titanium oxide. Garg does not make up for the deficiencies of Lin '917 because Garg also does not teach a titanium metal coating that is on the titanium structure.

Thus one of ordinary skill would have no apparent reason to mix and match the different underlying structures and coatings taught by the cited references to derive Applicant's claims. Lin '965 does teach a component comprising a structure made from titanium but not a titanium metal coating. Lin '917 teaches a titanium oxide coating, which is also not a titanium metal coating, and further does not teach a titanium structure. Garg teaches intervening layers and not a titanium metal coating on a titanium structure. Thus one of ordinary skill would have no apparent reason to remove the intervening noble metal interlayer taught by Garg, and substitute the titanium oxide coating taught by Lin '917, and then take the resultant coating and apply it to the titanium structure taught by Lin '965.

For at least these reasons, Lin '917 and Garg do not render claim 24 unpatentable, nor claim 26 which depends therefrom.

### **Claim 35**

Lin '965 in view of Lin '917 and Garg, considered singly or when combined, also fail to teach or suggest each and every limitation of claim 35, which is to: a substrate processing chamber component comprising: (a) a structure made from titanium, the titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and (b) a titanium metal coating on the titanium structure, the titanium metal coating comprising a twin-wire arc sprayed titanium metal coating having a textured surface.

As acknowledged by the Examiner, Lin '965 does not teach a component comprising a structure made from titanium. Nor does Lin '965 teach a titanium metal coating. Instead, Lin '965 teaches a component comprising a titanium structure, but which does not have a titanium metal coating over the titanium structure. Lin '917 also does not teach a substrate processing chamber component comprising "a structure made from titanium" as claimed. Lin '917 also does not teach a "metal coating" or a

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"titanium metal coating" on the component structure. Instead, the coatings of Lin '917 are ceramic coatings. Garg does not make up for the deficiencies of Lin '917 because Garg also does not teach a titanium metal coating that is on the titanium structure.

One of ordinary skill would not be motivated to substitute the metal coating of Garg with the components of Lin '917 because Lin '917 teaches ceramic coatings. Further, combination of Garg with Lin '917 would not result in the claimed component which has a metal coating that is on the titanium structure, because Garg teaches providing a noble metal interlayer between a coating and an underlying structure and further emphasizes that this interlayer is necessary to prevent spalling.

For at least these reasons, Lin '917 and Garg do not render claim 35 unpatentable, nor claim 36 which depends therefrom.

### **Claim 37**

Lin '965 in view of Lin '917 and Garg, considered singly or when combined, further fail to teach or suggest each and every limitation of claim 37, which is to: a substrate processing chamber component comprising: (a) a titanium structure comprising at least a portion of an enclosure wall, chamber shield, cover ring or deposition ring; and (b) a titanium metal coating on the structure, the titanium metal coating having a textured surface.

As acknowledged by the Examiner, Lin '965 does not teach a titanium metal coating. Instead, Lin '965 teaches a component comprising a titanium structure, but which does not have a titanium metal coating. Lin '917 does not teach a substrate processing chamber component comprising "a titanium structure" as claimed in claim 37, and also does not teach a "metal coating" or a "titanium metal coating" on the component. Instead, the coatings of Lin '917 are titanium oxide. Garg does not make up for the deficiencies of Lin '917 because Garg does not teach a titanium metal coating that is on the titanium structure. One of ordinary skill would not be motivated to

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substitute the metal coating of Garg with the coatings and/or components of Lin '965 and Lin '917 because they are all different. Further, combination of Garg with Lin '917 would not result in the claimed component which has a metal coating that is on the titanium structure, because Garg teaches providing a noble metal interlayer between a coating and an underlying structure and further emphasizes that this interlayer is necessary to prevent spalling.

For at least these reasons, Lin '965, Lin '917 and Garg do not render claim 37 unpatentable.

### CONCLUSION

The above amendments and remarks are believed to place the application in condition for allowance. Should the Examiner have any questions regarding the present amendment, the Examiner is requested to call the undersigned representative at: (415) 538-1555.

Respectfully submitted,  
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